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Brief 65-10336

NASA TECH BRIEF

Anodization Process Produces Opaque, Reflective Coatings on Aluminum

The problem: To develop a process for producing opaque, reflective anodic coatings on articles made of aluminum or its common alloys.

The solution: A process employing an anodizing bath containing an aqueous dispersion of any one of certain finely divided insoluble inorganic compounds, including refractory oxides, silicates, or pigments. The dispersed particles are transported through the bath and appear as uniformly distributed occlusions in the anodic deposit on the aluminum article.

How it's done: The anodizing bath is prepared by stirring the desired dispersant (e.g., zinc oxide or titanium dioxide) into a water solution of sodium aluminate. The proportions of the bath materials are approximately 2.5 grams of the aluminate, 5 grams of the dispersant, and 100 milliliters of water.

The metal to be anodized is thoroughly cleaned by any standard method before it is immersed in the bath. During the anodization, which is generally completed in 5 to 10 minutes, the bath must be constantly stirred and maintained at a temperature of approximately 77°F. The current density should be 40 ma/sq cm at the beginning of the process and reduced to approximately half this amount when the potential difference increases to 150 volts. Further reductions in current density will be required as the voltage continues to increase.

Notes:

1. Samples of anodic coatings with occluded zinc oxide or titanium dioxide on aluminum showed approximately 14% and 28% higher reflectances, respectively, than the unmodified anodic coating (without an occluded oxide).
2. Any of a variety of chemically stable inorganic materials can be dispersed in the anodizing bath to provide coatings of the desired color, opacity, reflectivity, and emittance characteristics. The process is simple and produces coatings that require no further treatment.
3. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama, 35812
   Reference: B65-10336

Patent status: NASA encourages the immediate commercial use of this invention. It is owned by NASA and inquiries about obtaining royalty-free rights for its commercial use may be made to NASA, Code AGP, Washington, D.C. 20546.

Source: Lockheed Missiles and Space Company
under contract to
Marshall Space Flight Center
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Category 03